

NOTE

LOW CATCHMENT AREA LAKES: NEW RECORDS  
FOR RARE COASTAL PLAIN SHRUBS AND  
*UTRICULARIA* SPECIES IN NOVA SCOTIA

NICHOLAS M. HILL

Biology Department, Mount Saint Vincent University,  
Halifax, Nova Scotia B3M 2J6, Canada  
e-mail: NHILL@msvu1.msvu.ca

J. SHERMAN BOATES AND MARK F. ELDERKIN

Wildlife Division, Department of Natural Resources,  
136 Exhibition Street, Kentville, Nova Scotia B4N 4E5, Canada

Nova Scotian wetlands have long been known for their diversity of Atlantic Coastal Plain plants (Fernald 1921). They are prized for their local abundances of rare Atlantic Coastal Plain species, whose diversity is greatest in large catchment area lakes (Hill et al. 1998). The large annual water level fluctuations (1–2 m) in lakes of large catchment area (> 50,000 ha) create a wide, ephemeral lakeshore habitat where biomass is kept low by prolonged flood stress in spring, intermittent flooding in summer, and ice disturbance during winter (Hill et al. 1998). Six of ten species of plants currently listed as Endangered, Threatened, or Vulnerable in Canada by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) occur on the shores of these large catchment area lakes. These species and sites are the primary focus of conservation efforts by the Atlantic Coastal Plain Recovery Team.

The temptation to concentrate conservation efforts on large CA (catchment area) lakes is undeniable given the clear monotonic increase in rare species diversity in lakes with increasing CA, but such large CA chauvinism may not be completely justifiable. This is because a few notable, rare coastal plain species occur in low CA (< 2000 ha) lakes. Taschereau (1984) made the first find of *Clethra alnifolia* L. in Canada on the shores of a low CA, Nova Scotian lake and subsequently, naturalist Charlie Allen discovered a second site at Louis Lake, another headwater lake (Newell 1997). Clearly, the shrub, *C. alnifolia*, did not obey the same CA rules that applied to the rare coastal plain herbs and the shrub



discrepancy was also upheld when *Toxicodendron vernix* (L.) Kuntze, new to maritime Canada (Hill 1989), was found along peaty shorelines of two headwater lakes. With the exception of a single *C. alnifolia* individual found at Canoe Lake (10,000 ha CA) by MacKinnon and Maas (Newell 1997), all recent findings of *C. alnifolia* continue to be made at low CA lakes. In this note, we report finding two additional low CA lake sites for the taxon. We also report new discoveries of rare floating, coastal plain plants (at the opposite end of the growth-form spectrum) in the same low CA sites.

Our field work in 1998 revealed large populations of *Clethra alnifolia* in the low CA lakes, Pretty Mary and Mudflat, which are immediately upstream from populations discovered at Mill Lake by Leslie Rogers (det. Marian Zinck). Stands were healthy and cottagers, unaware of the rarity of the shrub, remarked that they had difficulty eradicating it from cleared areas on their properties. Growth in these cases appeared to be vegetative only, as was found by Taschereau for the stands of *C. alnifolia* on Belliveau Lake (Taschereau 1984). However, we collected representative seedlings from under *C. alnifolia* stands on Belliveau, Louis, and Pretty Mary Lakes on August 25, 1998, and grew them in pots for a year, both outside in a cold frame and inside the greenhouse. Seedlings were identified as *Ilex verticillata* (L.) A. Gray, *Rhododendron canadense* (L.) Torr., and *Chamaedaphne calyculata* (L.) Moench at Pretty Mary Lake; *Nemopanthus mucronatus* (L.) Loes, and *Ilex verticillata* at Belliveau Lake; and *Clethra alnifolia* at Louis Lake. This is the first evidence that any population of *C. alnifolia* in Nova Scotia can reproduce sexually. Despite the discovery of seedling recruits at Louis Lake, all young shoots under parent stems appeared to be vegetative suckers, and even in the main range of *C. alnifolia*, in New Jersey, seedling survival in intact woodland appears to be tenuous (Jordan and Hartman 1995).

While lakeshore emergent herb diversity increases with increasing disturbance along a lake CA gradient, shrub diversity is negatively correlated with fetch, a variable linked to disturbance through wind energy (Hill and Keddy 1992). The rare shrubs discussed above occur on the shores of relatively small surface area, low CA lakes and they grow in a zone essentially free of ice scour disturbance. In similar fashion, large CA lakes may not be priority habitats for rare floating plants. In Canada, *Utricularia*



*radiata* Small occurs only in lakes in southwestern Nova Scotia, where it typically grows in 1–3 m deep water in association with *Brasenia schreberi* J. F. Gmelin. There have been few known reports of this species in Nova Scotia (Brown 1940; Roland 1976; Zinck and Roland 1998); the taxon has a global ranking of G4 and in Canada is considered imperilled because of rarity of occurrence (6–20 occurrences; Zinck et al. 1994). While investigating new sites for *Clethra alnifolia*, we found large populations of *U. radiata* in sheltered parts of the two low CA lakes. This reinforced our realization that while rare coastal plain herb species richness is tied to large CA lakes, coastal plain plants of quite different functional groups (viz., shrubs and floating plants) may be best represented at the opposite end of the disturbance gradient, in low CA lakes. *Utricularia radiata* records include old herbarium data (ACAD), findings made at Kejimikujic Park (Roland 1976; updates by Peter Hope) and new findings of our own over the past two summers (see Appendix). When these records are put into catchment area classes, it is evident that the species is more likely to occur in low CA lakes; out of a total of twenty lake records, eleven were from low CA, two from large CA, and six from intermediate CA lakes between these extremes. At the large CA lake sites, the taxon was found in the most sheltered locations.

Our last low CA lake addition to Nova Scotia's rare Atlantic Coastal Plain plants is a white-flowered form of *Utricularia purpurea* Walter, discovered in 1998 at Pretty Mary Lake. There were extensive mats of this form and none of the typical, lilac-flowered form, which suggests that regeneration at this site may be strictly clonal. *Utricularia purpurea* forma *alba* has been reported from a pond in New Hampshire where, as in the present case, only mats of white-flowered plants were present (Hellquist 1974). Vouchers of our specimens are housed at the E. C. Smith Herbarium at Acadia University (ACAD).

Conservation planning for Atlantic Coastal Plain plants has benefitted from our knowledge of the relationship between hydrology and diversity of rare coastal plain communities in Nova Scotia (Hill et al. 1998). This model allows us to concentrate field efforts on lakes of large CA and to make recovery plans for a suite of rare herbs occurring on these naturally disturbed lake-shores. Despite the value of this approach in time saving and habitat acquisition, our new records clearly indicate a need to



gather more information on low CA lakes. Further, there is a need to assess and accommodate the conservation needs in Nova Scotia for these species in addition to those of the disturbance-linked, rare coastal plain herbs.

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#### APPENDIX

##### RECORDS FOR *UTRICULARIA RADIATA*

The records have been annotated for lakes of three catchment area classes: low CA (< 2000 ha), intermediate CA (2000–50,000 ha), and large CA (> 50,000 ha). Records were taken from three sources: E. C. Smith Herbarium



(ACAD) sheets for the taxon, Kejimkujic National Park records (Roland 1976, with map updates provided by Peter Hope), and the authors' findings for 1998–1999. Sites listed on ACAD herbarium sheets were revisited to re-locate the taxon in the field.

#### ACAD Herbarium Records

1. Halifax Co., Sawlor's L. (low CA), 1940, S. Mason, A. Gorham, and H. P. Bell; re-located 1998.
2. Lunenburg Co., Ashland L. (low CA), 1957, E. C. Smith, A. C. MacDonald, and W. J. Curry; re-located 1998.
3. Lunenburg Co., Huey L. (low CA), 1957, E. C. Smith, A. C. MacDonald, and W. J. Curry; unable to re-locate in 1998.
4. Lunenburg Co., Lawson L., syn. "Larsen L." (intermediate CA), 1953, E. C. Smith, J. Taylor, D. H. Webster, and L. B. Slipp; re-located 1998.
5. Yarmouth Co., Carleton—lake not recorded on sheet, may refer to Mill L. (intermediate CA), 1952, E. C. Smith, J. C. Taylor, D. H. Webster, and L. B. Slipp; re-located at Mill L. in 1999, see New Findings below, # 6.

#### Kejimkujic National Park Records (P. Hope, Chief Interpreter, pers. comm.)

1. Annapolis Co., Kejimkujic L. (large CA).
2. Annapolis Co., Grafton L. (intermediate CA), A. E. Roland.
3. Annapolis Co., Puzzle L. (low CA), A. E. Roland.
4. Annapolis Co., North Cranberry L. (low CA).
5. Annapolis Co., Little Peskowsk L. (low CA).
6. Annapolis Co., Loon L. (large CA), R. Belliveau.
7. Annapolis Co., Big Dam L. (intermediate CA), 1976, A. E. Roland.
8. Annapolis Co., Turtle L. (low CA), 1976, T. Bowers.

#### New Findings

1. Lunenburg Co., Pretty Mary L. (low CA), 1998, J. S. Boates, M. F. Elderkin, and N. M. Hill.
2. Lunenburg Co., Mudflat L. (low CA), 1998, J. S. Boates, M. F. Elderkin, and N. M. Hill.
3. Lunenburg Co., Horseshoe L. (low CA), 1998, P. Mills and J. S. Boates.
4. Lunenburg Co., Darling L. (low CA), 1998, P. Mills and J. S. Boates.
5. Shelburne Co., Gold L. (low CA), 1998, J. S. Boates.
6. Yarmouth Co., Mill L. (intermediate CA), 1999, N. M. Hill, M. Myra, and J. W. Hill.
7. Annapolis Co., Eleven Mile L. (intermediate CA), 1999, N. M. Hill and J. W. Hill.